

[illegible]

5 Field of the Invention

10 Related Background Art

15 in an office job, trade business, technological
business not needing a large equipment. Generally, the
workers arrive at the office space until the working
start time utilizing public transportation, private
cars or the like and work together in that office
20 during a predetermined working time. Efficient working
in various jobs has been realized by equipping a
telephone, a copying machine, a fax machine, a
computer, a computer network and the like in the office
space.

25 This collective working custom is comparatively a recent phenomenon which comes into adoption for the purpose of realizing an efficient management of a

cars and the like depending on a collective working style have been remarkably brought. On the other hand, since the communicating infrastructure such as the Internet or the like and various communicating technology have been able to be utilized, the collective working style is not always an inevitable working style for each organization and the workers. Preferably, a dispersive working style, which is characterized in that the workers belonging to the same organization are to be telecommuted at respective homes or favorite places near the organization such that the intended business is to be collectively performed, has been gradually noticed.

Generally, in order to realize the dispersive working style in the organization such as a company or the like, one room in each worker's home is used as a working space (called home office hereinafter) and plural home offices dispersed at remote places are connected each other through a communication line so as to adopt a method of using a home communication terminal device such as a telephone, a fax machine and the like, and a communication application system, whereby necessary communication means among the workers

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send not only business information but other information to the teleworker".

Generally, in an ordinary office, it is considered that information other than the business information is almost casually exchanged among the workers in a rest room (refresh room) during a rest time. The above various home communication terminal devices and the communication application which realize the dispersive working style can not realize the informal communication as exchanged in the rest room, among the workers dispersed at remote places.

The decrease of the informal communication among the workers inevitably causes difficulty in sense of unity within the organization, and the workers feel the sense of isolation or alienation. This fact becomes a serious hindrance in continuing the dispersive working style for a long period.

As a second problem, in the home office, the teleworker is in a risk of falling into a state being
felt the overwork comparing with ordinary workers of
the collective working style. According to the above
booklet, it is warned that "in case of a home working
style, it must be avoided from the careless long work
or the work extended to the midnight owing to an excess
zeal of the worker for the work". As indicated by the
documentary records other than the above booklet
related to home working, since the home worker is

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Other objects of the present invention will become apparent from the following explanation based on the accompanying attached drawings and the appended claims.

Fig. 1 is a schematic structural block diagram according to an embodiment of the present invention;

Fig. 2 is a view showing hardware structure of a
5 host server device 12;

Fig. 3 is a view showing software structure of the host server device 12;

Fig. 4 is a view showing equipment structure of user terminal devices 30, 32 and 34;

10 Fig. 5 is a view showing an arrangement example of
the user terminal devices 30, 32 and 34;

Fig. 6 is a view showing a screen example called an office view displayed on a virtual office display unit 44;

15 Fig. 7 is a view showing a screen example called a
refresh room view displayed on the virtual office
display unit 44;

Fig. 8 is a flow chart of a first operation according to the present embodiment;

20 Fig. 9 is a flow chart of an operation in a client
according to a second operation example;

Fig. 10 is a flow chart of an operation in a host server device 12 according to the second operation example;

25 Fig. 11 is a flow chart of a modified portion of a
third operation example; and

Fig. 12 is a flow chart of a modified portion of a

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Fig. 2 shows an example of hardware structure of the host server device 12. A BP (Basic Platform) 12a is composed of a PC host server device. An SPU (Signal processing Unit) 12b is a signal processing board composed of a high-performance DSP (Digital Signal processor) or the like. The SPU 12b is utilized in processing a signal such as an image signal, a voice sound signal or the like at a server side. The BP 12a is connected to the LAN 14 in the main office 10 through a LAN board. The structure itself as mentioned above is known and another known structure can be adopted.

Fig. 3 is a schematic structural block diagram of software structure of the host server device 12. The software to be installed in the host server device 12 includes a software program developed by use of the C++ language or the like and a conventional software program, and Windows NT (trademark of Microsoft, U.S.A.) is adopted as an OS (Operating System). In Fig. 3, numeral 50 denotes a server manager, numeral 52 denotes an SPU access library, numerals 54 and 56 denote drivers, numeral 58 denotes a mail transmission unit, numeral 60 denotes a DLL (Dynamic Link Library),

numeral 62 denotes a dynamic web server, numeral 64 denotes a database connector, numeral 66 denotes the Windows NT (registered trademark of Microsoft, U.S.A.) and numeral 68 denotes a database.

5 Fig. 4 shows an example of hardware structure of the user terminal device 30. As already known, the computer 36 is composed of a main body 70, a mouse 72, a keyboard 74, a display 76, a microphone 78, a speaker 80 and a MODEM 82 (or terminal adaptor). The virtual
10 office displaying unit 44 composed of a similar video monitor device as compared with that of the display 76 is connected to the main body 70 and is used for displaying a virtual office screen.

 Fig. 5 shows an example of setting state of the
15 equipments shown in Fig. 4 in the home office. In this home office, the virtual office display unit 44 is located on a place different from a place of the display 76 of the computer 36 to be used by the user in performing operations.

20 Next, an operation of the present embodiment will be described. To simplify the description, it is assumed that each user at the home office has already finished to connect the user terminal devices to the host server device 12 by operating the own user
25 terminal devices 30, 32 and 34 and has started to work.

 Fig. 6 shows a screen called an office view to be displayed on the virtual office display unit 44.

Numeral 90 denotes an image which indicates working status of another user. Numeral 92 denotes a working status data display portion for displaying the user's name and working status data of the user by character information. Numeral 94 denotes a private room office space of the user. Substance obtained by totalizing the above three factors is a virtual private room office of the user. In Fig. 6, nine private room offices are display on the same screen. However, the number of the private room offices may be more than or less than nine. A space for displaying these private room offices is called a private room office area 96. A space between the private room office and the adjoining private room office is a virtual corridor portion. The user working status image 90 being displayed as a part of the private room office is an image taken by the video camera 42 provided on the user terminal device to be used by the user. As indicated by user working status images of SC213, SC231 and SC233, when the camera 42 does not operate, images are not displayed.

Generally, in a case where the user is working, the office view as shown in Fig. 6 is displayed on the virtual office display unit 44.

Fig. 7 shows an example of a screen on the virtual office display unit 44 called a refresh room view. In this example, independent four refresh corners are

20 The image 110-4 reproducing the desk scene and the
decorative image 110-5 are previously registered and
stored in the host server device 12 and are properly
transferred to the user terminal devices 30, 32 and 34
to be displayed on a screen of the refresh room view on
25 the virtual office display unit 44 as shown in Fig. 7.

The users sat down on the same table can select the cooperative rest tool capable of realizing the

informal communication and the rest. The cooperative rest tool in this embodiment includes three kinds of tools, that is, a voice meeting tool (also called voice chat tool) and a character meeting tool (also called text chat tool) and a multiuser game tool. Any of these tools can be realized to operate by the known technology.

For example, the voice meeting tool enables the each user to perform a voice meeting/chat among plural places by using the microphone 78 and the speaker 80 of the each user terminal device upon starting both a voice meeting client software (voice telephone client software for TCP/IP network conforming to ITU-T Standard H.323) installed to the user terminal device and a voice meeting server software (plural points voice telephone meeting server software for TCP/IP network conforming to ITU-T Standard H.323) installed to the host server device 12.

The character meeting tool enables the each user to perform a character meeting/chat by inputting characters using a keyboard while reading a text chat window displayed on the display 76 of the each user terminal device or a text chat window (to be simultaneously displayed on a window different from a refresh room display screen) displayed on the virtual office display device 44 upon starting both a character meeting client software (character meeting client

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software for TCP/IP network conforming to IRC (Internet Relay Chat) standard) installed to the user terminal device and a character meeting server software (plural points character meeting server software for TCP/IP network conforming to IRC standard) installed to the host server device 12.

The multiuser game tool enables the each user to perform a game with the multiuser by utilizing a multiuser game window to be displayed on the display 76 of the each user terminal device, the mouse 72 and the keyboard 74 upon starting both a multiuser game client software (plural points communication game software for TCP/IP network) installed to the user terminal device and a multiuser game server software (multiuser game server software for TCP/IP network) installed to the host server device 12.

Since the voice meeting tool, the character meeting tool and the multiuser game tool are based on the known technology and the description is merely an example of utilizing explanation, more description will be omitted. During an elapse of time while the users at the plural user terminal devices cooperatively uses these tools, a software 38 for the user terminal device is simultaneously operated. Therefore, the user can continuously look an image of updating the working status of another user. A time when the user come in the refresh room is displayed on an entrance time

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5 The user recognizes another user stays in the
refresh room view and can communicate with the another
user utilizing the prepared tool.

15 Next, another operation example between the host
server device 12 and the user terminal devices 30, 32
and 34 will be described. Fig. 9 is a flow chart of
operations of obtaining and displaying image data of
the user's side terminal devices 30, 32 and 34 being
20 the clients and controlling the virtual space. Fig. 10
is a flow chart of operations of recognizing the pose
and distributing images performed in the host server
device 12.

An image taken by the each video camera is
inputted to the computer main body 70 through a video
input unit of the computer main body 70 to be captured
as digital image data of a QCIF format (176 x 144

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The user terminal device of that user receives image data of another user stays in the refresh room from the host server device 12 (step S28) and displays it on the virtual office display device 44 (step S30) after executing expansion processing (step S29). If an instruction of processing end is not given from the user (step S31), a flow returns to the step S1, and if it is instructed, the processing is ended.

Also, in this embodiment, the user recognizes another user stays in the refresh room view and can communicate with the another user utilizing the prepared tool. Further, processing load on the user terminal devices 30, 32 and 34 can be reduced by causing the host server device 12 to execute processing of recognizing the state of a person.

In the above embodiment, the virtual space is controlled on the basis of the result of recognizing the pose of the user. However, the virtual space may be controlled on the basis of the result of recognizing concentration of the user. A modified example thereof will be described. More particularly, processing in the steps S4 and S5 shown in Fig. 8 is changed to that shown in Fig. 11.

25 Difference data between images is calculated with
reference to plural image frame data sequentially
continued with the elapse of time (step S51), and an

15 In this manner, in a case where the user
concentrates the work for a long time, the user is
automatically moved to a virtual rest room in the
virtual space to make the user take the rest. At this
time, it is possible to make the user has a chance of
20 taking the accidental informal communication with
another user stays in that rest room.

In the above embodiment, the virtual space is controlled in accordance with the image recognition result. However, the virtual space may be controlled in accordance with a result obtained by recognizing user's emotion utilizing voice sound. Fig. 12 is a flow chart of substitutive processing in the steps S4

and S5 shown in Fig. 8.

5 Voice sound data of the user is captured to the computer main body 70 from the microphone 78 or the telephone 40 to be used by the user (step S61), and the user's emotion is recognized based on the captured voice sound data (step S62). For example, according to methods disclosed in Japanese Patent Application Laid-Open Nos. 5-012023 and 9-81632, the emotion can be recognized on the basis of the voice sound data. If it is judged that the user is in a great stress condition (condition of anger, impatience, irritation, uneasiness or the like) in accordance with the recognition result (step S63), the user is compelled to be moved to the refresh room for taking the rest.

10 In this manner, in a case where the user performs the work with the great stress condition, the user is automatically moved to the virtual rest room in the virtual space to make the user take the rest. At this time, it is possible to make the user has a chance of taking the accidental informal communication with another user stays in that rest room. Accordingly, the stress can be reduced.

15 Although an embodiment for realizing various functions using software on a general-purpose computer by providing the virtual office display device 44 besides a display unit of a computer was described, the present invention is not limited to this case. For

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by tracing head motion while recognizing the user's head.

The user's emotion can be discriminated by a method of recognizing face expression in accordance with image information.

As above, it is needless to say that the object of the present invention can be achieved in a case where a storage medium storing the program codes of a software for realizing the above-described embodiments is supplied to a system or an apparatus and then a computer (or CPU or MPU) in the system or the apparatus reads and executes the program codes stored in the storage medium.

In this case, the program codes themselves read from the storage medium realize new functions of the present invention, and the storage medium storing such the program codes constitutes the present invention.

The storage medium for supplying the program codes can be, for example, a floppy disk, a hard disk, an optical disk, a magnetooptical disk, a CD-ROM, a CD-R, a magnetic tape, a non-volatile memory card, a ROM, an EEPROM, or the like.

It is needless to say that the present invention also includes not only a case where the functions of the embodiments are realized by the execution of the program codes read by the computer, but also a case where an OS (operating system) or the like functioning

5 Further, it is needless to say that the present invention further includes a case where the program codes read from the storage medium are once stored in a memory provided in a function expansion board inserted in the computer or a function expansion unit connected to the computer, and a CPU or the like provided in the function expansion board or the function expansion unit executes all the process or a part thereof according to the instructions of such program codes, thereby realizing the functions of the embodiments.

Further, it is needless to say that the present invention is also applicable to a case of achieving the object by supplying the program to the system or the apparatus. In this case, the system or the apparatus can obtain an effect of the present invention by reading the storage medium which stores the program represented by a software for achieving the present invention for the system or the apparatus.

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reading out the program represented by the software for achieving the present invention from the database on a network based on a communication program.

5 The present invention is not limited to the above-described embodiments, and various modifications are possible within the spirit and scope of the appended claims.

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